Chuck Saxe: Tek's newest Chief Engineer

He's not one to overshoot aliased edges

IC maker Chuck Saxe deals technological aces and face cards, matching the latest in integrated circuit technology to the latest in customer-needed functions. By dealing such cards, Chuck and his associates create for us technological advantages that competitors can't easily overcome.

Too bad that type of advantage doesn't last like it used to. Like the candy coating on an M&M, it erodes rapidly in the saliva of hungry competitors.

It can be gone in a year or two. This slipawayness of advantage has made rapid product development essential. Competition allows little time to blunder around in product and circuit trial and error. Product designers must have good-the-first-time chips, absolutely on time. The Advanced Development Group (ADG) that Chuck manages thrives on this challenge.

In the last three years, ADG has given Tek product designers 40 special IC's just when they wanted them. And every IC worked according to the designer specifications. "100 percent functional first silicon" is an enviable record for the group that Chuck has managed for six years now. IC designs have proven out so well "on first silicon" that some products go to DC—the design-completion milestone—when IC specifications are complete.

Chuck Saxe was named a chief engineer because he and his group do wonderfully predictable things with integrated circuit technology.

"Perhaps ADG succeeds," he said, "because I'm a contributor as well as manage—I'd be bored if all I did was manager." He contributes knowledge of the physical constraints of advanced IC technologies; CAD tool-making skills; rapport with both product designers and peers in the semiconductor industry.

His outlook may be a factor too: He thinks Tektronix is a "great place to work." Why? "Working somewhere where management rigidity is the rule makes you appreciate the looseness (freedom) we still have here at Tek." Gary Neher, Chuck's manager, describes this freedom as providing Chuck with "only the broadest guidelines."

Is he a workaholic? Not in the sense of marathon design efforts or midnight hours. "Forty hours, maybe up to 60 sometimes," goes into his work week. He gets up early, but not to tend to Tek problems. He helps Andrea, 7, and Wayne, 6, off to school. Harriet Saxe works mornings at the Veterans Administration. She is back in the Saxes' South Beaverton house when the kids get home.

After hours, he bicycles or swims several times a week, but these are spurts of exercise, not month-after-month activity. He does portraits, too, in watercolors and pastels.

On the job, he's a model for working smarter, not harder. He's smart about computer-aided engineering and design tools. He has a knack for design algorithms too.

Harriet and Chuck Saxe moved to Oregon in 1978, leaving RCA and the Philadelphia area so that Chuck could bring his expertise in digital techniques and IC's to Tektronix.

To some extent he found an aversion here to the use of custom digital-IC approaches; perhaps it was designer and management discomfort with digital's seemingly "weird techniques." Chopping up an analog signal into bits for processing for display or analysis did seem a bit like chopping up beef into hamburger and then reconstituting it as steak.

Digitizing changes everything about a signal. Unfortunately, it also adds something in the process. For one thing, it introduces what engineers call "aliasing." Aliasing causes processing errors anytime a waveform changes. Sharp changes are particularly a problem. If the processing circuits are designed with the right algorithms, these errors can be minimized—somewhat as a shock absorber minimizes a car wheel's transition through a pothole so that the wheel rolls in and out, without bouncing. Chuck's algorithms are instructions that do the shock absorbing job in waveform-processing circuits.

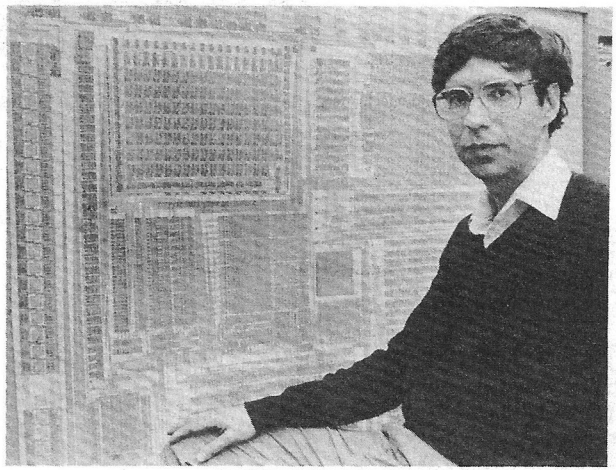
Chuck had worked on "big" IC's, big in the sense of having many devices and interconnections to manage and control. In the process he had become a pretty good tool builder.

To work at the leading edge of technology, innovators often have to do more than invent. Whether working in bio-tech, superconductivity, or electronics, people who squeeze technology into practical applications wind up developing tools. Unfortunately, these tend to be quirky, special tools unsuitable for broader use. Not so with many of the tools Chuck has had a hand in developing.

Take libraries, for example.

Libraries in the computer-aided design of IC's enable users—the divisional designers—to concentrate on the custom elements of the design without worrying much about detail. A good library takes care of the routine elements that absorb much of the effort even in the most exotic projects.

It's nice when a library is also flexible enough to allow IC designers to defer critical choices—like what semiconductor process (that is, what material) is to be used. To stretch an analogy, it would be like allowing the designer of high-performance race cars to do the car, controls, wheels, brakes, and whatever before getting specific about the engine. Later, someone could use the same "libraries" to work up a family station wagon.



SAXE: More than manages

Some of ADG's libraries are part of a quick-turnaround MOS IC design system that has produced semicustom chips for product designers in seven divisions. ADG, although part of the Instrument Group, serves "customers" all over Tek, including Grass Valley and Wilsonville. Product designers have learned to come to ADG with problems. For example, when another source of advanced semicustom MOS IC's left the field recently, ADG picked up seven projects in midstream. They delivered seven designs with "100 percent functionality at first silicon." That, in ordinary English, means everything in each of the first chips delivered worked. All seven showed up on time too.

"In ADG we do the physical design, the bricks and mortar. Product designers in the divisions 'wire up' the logic elements. For this we provide them with 'invisible tools'—the cells and marocells with which the product designer "assembles" custom designs with the aid of computer power. This is done in logical blocks of functions. (Tools are invisible, or transparent, when they function behind the scenes without user involvement.) The tools capture the circuit, test it by computer modeling, and package all the design data in a form we, in ADG, use to lay out the chip. Then a silicon foundry works from all this to make the actual chip.

"Part of my job is to consult with product designers and division strategists, suggesting new technology just about to come on line. Since much of our work is aimed at digitizing waveforms for digital processing and analysis, we have to develop algorithms, flow charts, to balance out the distortion-causing characteristics of digitizing."

Chuck didn't know in high school that he wanted to be an IC expert. He didn't even know for sure he wanted to be an electrical engineer. He knew something in electronics or physics seemed like a good, generalized goal. So he studied electrical engineering at the University of Maryland, and was a co-op student worker at U.S. Army's Harry Diamond Labs in the District of Columbia.

After graduation in 1974, he took, his BSEE to RCA. During his four years at RCA, mostly at Camden, he earned a master's in engineering and computer information systems from the University of Pennsylvania.

Perhaps only a few hundred Tek employees know who Chuck Saxe is. Maybe fewer. Although his name is on six patents or patent applications, and on product-planning invite lists around Tek, and on industry communications, he seems to have a low profile. Like the CAD tools he has developed he is invisible to most of us, but it's nice to know he's there in Bldg. 47 working for us, not the competition.□

—Art Andersen